

REMARKS/ARGUMENTS

The amendment to Claim 1 is supported by the claim itself and by specification page 4, lines 13-14 and 28-32. Claim 19 has been amended to correspond with amended Claim 1. No new matter has been entered.

Applicants would like to thank the Examiner for the indication that claims 10-18 and 20 are directed to allowable subject matter. As noted by the above amendment, Claim 10 has been placed in independent form by incorporating therein prior (unamended) Claim 1. As Claims 11-18 and 20 are dependent, directly or ultimately, on Claim 10 these claims are all now in condition for allowance.

The rejection of Claims 1-9 and 19 over Tanaka in view of Ninane is traversed.

As the Examiner has noted, Tanaka (U.S. 6,207,123) is described in the present specification at the top of page 2. The Examiner is also correct that Claim 1 did not, and does not, require that the crystallization of sesquicarbonate crystals in b) be carried out without preliminary evaporation of the aqueous suspension.

Tanaka (US 6,207,123) discloses a process for producing sodium carbonate, which comprises:

- i. adding solid sodium carbonate and dissolving it to a first aqueous solution containing sodium carbonate and sodium hydrogenocarbonate (Col. 4, Lines 61-68),
- ii. preferably removing nondissolved residues of the crude sodium carbonate (Col.5, L3-6),
- iii. then aqueous solution obtained is supplied to an evaporator under vacuum where part of the water is removed (Col. 5, L.10-11),
- iv. then the temperature is lowered in order to crystallize at least 50% of the NaHCO<sub>3</sub> contained in the initial trona solution, by precipitating sodium sesquicarbonate (Col. 5, L.23-24),
- v. separating sesquicarbonate crystals and recycling them to a calciner (Col. 5, L.38-43),
- vi. processing the remaining concentrated mother liquor toward purification filtration and a sodium monohydrate crystallizer-evaporator (cf. Fig1), and
- vii. drying the sodium carbonate monohydrate into anhydrous sodium carbonate.

An important difference between the claimed invention and Tanaka lies in the fact that in the claimed invention the amount of sodium carbonate added to the aqueous solution comprising sodium bicarbonate and sodium carbonate is adjusted such that sodium sesquicarbonate solubility is exceeded, thereby enabling the formation of the aqueous suspension containing crystals of sodium sesquicarbonate. This pre-addition of sodium carbonate, in this amount, clearly is different and distinct from, and not suggested by, Tanaka's teaching at col. 5, lines 10-29 requiring the careful evaporation of water from the aqueous solution in order to controllably adjust the concentration of sodium sesquicarbonate and thereby cause its precipitation while holding sodium carbonate in solution. This difference, in present invention, of sodium carbonate being added in excess also leads to an important benefit: the sodium carbonate added in a) recrystallizes spontaneously into sodium sesquicarbonate,  $\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$  (see specification page 4, lines 28-32) and enables the removal of sodium carbonate from the aqueous solution, into a valuable and recyclable solid.

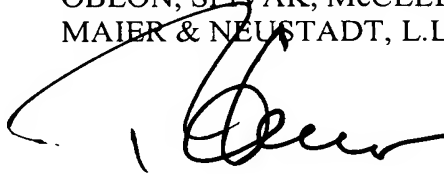
Ninane (US 6,478,828), cited as making up for that lacking in Tanaka by virtue of its disclosure of sodium carbonate monohydrate solubility at high temperature, discloses that sodium carbonate monohydrate solubility decreases with temperature (Col. 3, lines 16-18), but this has no impact regarding present invention, as in a) herein it is sodium sesquicarbonate that crystallizes. Moreover, sodium sesquicarbonate has the opposite behavior to sodium carbonate monohydrate: its solubility *increases* with temperature (see Figure 3 of the present invention). Ninane also teaches that supersaturation must be limited in order to avoid primary and secondary seeding within the solution (Col 2. lines 16-17). On the contrary, in the presently claimed invention crystals of sodium sesquicarbonate are generated in a), this generation inducing primary or secondary seeding (nucleation) during the transformation of sodium carbonate crystals to sodium sesqui crystals (e.g., through a

nucleation and growth mechanism). Finally, Ninane is consistent with Tanaka in describing supersaturation for an inorganic substance as being accomplished with an evaporation step (Col. 5, lines 30-31).

Therefore, and in view of the above, one of ordinary skill in the art, reviewing both Tanaka and Ninane at the time the invention was made, clearly would not have found direction or motivation to add sodium carbonate to an aqueous solution comprising sodium bicarbonate and sodium carbonate in an amount sufficient to exceed the solubility of sodium sesquicarbonate and to form an aqueous suspension comprising crystals of sodium sesquicarbonate. As such, Applicants respectfully submit that amended Claim 1 and dependent claims 2-9 and 19, pending herein, are patentably distinct from the teachings of Tanaka taken with Ninane and respectfully request the reconsideration and withdrawal of the outstanding rejections, and the passage of this case to Issue.

Respectfully submitted,

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